

What is claimed is:

1. A method of recovering acrylic acid from a mixture comprising acrylic acid, water and acetic acid comprising:

(a) extracting acrylic acid from said mixture with a solvent mixture comprising ethyl acrylate as the preponderant component thereof and an organic co-solvent selected from the group consisting of toluene, heptane, 1-heptene, methylcyclohexane, cycloheptane, cycloheptadiene, cycloheptatriene, 2,4-dimethyl-1,3 pentadiene, methylcyclohexene and methylenecyclohexene to form an extracted composition; and

(b) azeotropically distilling said extracted composition to recover acrylic acid.

2. The method according to Claim 1, wherein said steps of extracting acrylic acid and azeotropically distilling the extracted composition are carried out in a continuous process to form a residue stream the preponderant component of which is acrylic acid.

3. The method according to Claim 2, wherein said residue stream is composed of at least 98 weight percent (wt %) acrylic acid.

4. The method according to Claim 3, wherein said residue stream is composed of at least 99% acetic acid.

5. The method according to Claim 2, wherein said residue stream contains less than about 0.75 wt % acetic acid.

6. The method according to Claim 5, wherein said residue stream contains less than about 0.5 wt % acetic acid.

7. The method according to Claim 2, wherein said residue stream contains less than about 0.5 wt % water.

8. The method according to Claim 7, wherein said residue stream contains less than about 0.1 wt % water.

9. The method according to Claim 1, wherein the extracted composition comprises at least about 50 wt % ethyl acrylate.

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10. The method according to Claim 9, wherein the extracted composition contains at least about 20 wt % acrylic acid.

11. The method according to Claim 1, wherein said organic co-solvent is toluene.

12. The method according to Claim 1, wherein the weight ratio of ethyl acrylate to said organic co-solvent in said solvent mixture is from about 80:20 to about 95:5.

13. The method according to Claim 12, wherein the weight ratio of ethyl acrylate to said organic co-solvent in said solvent mixture is from about 85:15 to about 95:5.

14. The method according to Claim 13, wherein said organic co-solvent is toluene.

15. The method according to Claim 1, wherein said process is operative to remove at least about 75 wt % of the acetic acid present in the mixture of acrylic acid, water and acetic acid undergoing purification.

16. The method according to Claim 15, wherein said process is operative to remove at least about 80 wt % of the acetic acid present in the mixture of acrylic acid, water and acetic acid undergoing purification.

17. A method of recovering acrylic acid comprising:

(a) providing a feed stream containing acrylic acid, water, acetic acid, ethyl acrylate and an organic co-solvent selected from the group consisting of toluene, heptane, 1-heptene, methylcyclohexane, cycloheptane, cycloheptadiene, cycloheptatriene, 2,4-dimethyl-1,3 pentadiene, methylcyclohexene and methylenecyclohexene to a distillation column, wherein the weight ratio of ethyl acrylate to said organic co-solvent is from about 80:20 to about 95:5; and

(b) azeotropically distilling said feed stream to provide a residue stream, the preponderant component of which is acrylic acid.

18. The method according to Claim 17, wherein said residue stream contains at least about 98 wt % acrylic acid.

19. The method according to Claim 18, wherein said residue stream contains at least about 99 wt % acrylic acid.

20. The method according to Claim 17, wherein said feed stream contains from about 5 to about 40 wt % water, from about 1 to about 4 wt % acetic acid and up to about 80 wt % acrylic acid.

21. The method according to Claim 20, wherein said residue stream contains less than about 0.75 wt % acetic acid.

22. The method according to Claim 21, wherein said residue stream contains less than about 0.5 wt % acetic acid.

23. The method according to Claim 20, wherein said residue stream contains less than about 0.5 wt % water.

24. The method according to Claim 23, wherein said residue stream contains less than about 0.1 wt % water.

25. The method according to Claim 17, wherein said organic co-solvent is toluene.

26. The method according to Claim 25, wherein the weight ratio of ethyl acrylate to toluene in said feed stream is from about 85:15 to about 95:5.

27. The method according to Claim 17, wherein said process is operative to remove at least about 75 wt % of the acetic acid present in the feed stream undergoing purification.

28. The method according to Claim 27, wherein said process is operative to remove at least about 80 wt % of the acetic acid present in said feed stream.

29. The method according to Claim 17, wherein said azeotropic distillation is carried out with a temperature of about 100°C about the lower portion of said distillation column.

30. The method according to Claim 29, wherein the temperature about the central portion of said distillation column is maintained at a temperature of about 60°C when azeotropically distilling said feed stream.